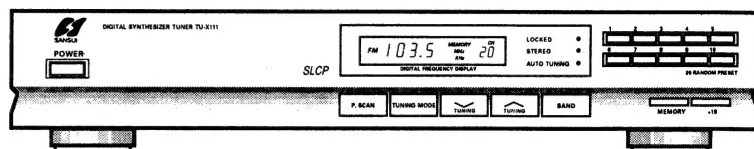




SERVICE MANUAL

TU-X111 TU-X111L

DIGITAL SYNTHESIZER TUNER



CAUTION

1. Parts identified by the Δ symbol on the schematic diagram and the parts list are critical for safety. Use only replacement parts that have critical characteristics recommended by the manufacturer.
2. Make leakage-current or resistance measurements to determine that exposed parts are acceptably insulated from the supply circuit before returning the appliance to the customer.

NOTICE

The symbols, UK, EU, EG, IPT, SEV, SS and XX <EXPORT> on the parts list and the schematic diagram mean followings respectively.

UK..... Manufactured for United Kingdom market.
EU..... Manufactured for European market.
(Except F.R.Germany, Italy, Swiss and United Kingdom)
EG..... Manufactured for F.R. Germany market.

IPT..... Manufactured for Italy market.
SEV..... Manufactured for Swiss market.
SS..... Manufactured for Saudi Arabian market.
XX <EXPORT>..... Standard Version.
NON MARK..... Common Parts.

Specifications

Tuner (TU-X111 / TU-X111L)

FM Section

Tuning range.....88 to 108 MHz

Usable sensitivity

Mono.....10.8 dBf

50 dB quieting sensitivity

Mono.....14 dBf

Stereo.....36 dBf

Signal to noise ratio at 85 dBf

Mono.....80 dB

Stereo.....74 dB

Distortion at 65 dBf

Mono.....less than 0.15 % at 1,000 Hz

Stereo.....less than 0.2 % at 1,000 Hz

Stereo separation.....45 dB at 1,000 Hz

Frequency response.....30 to 15,000 Hz +0.3 dB, -0.8dB

Antenna input impedance.....300 ohms balanced
75 ohms unbalanced

AM (MW) Section

Tuning range.....530 to 1,600 kHz

Usable sensitivity.....50 dB/m

Signal to noise ratio.....50 dB

Image response ratio.....40 dB at 1,000 kHz

TU-X111L

LW Section

Tuning range.....153 to 281 kHz

Others

Output voltage and impedance

0.775 V / 2.2 kohms

Power requirements

Power voltage.....120/220/240 V (50/60 Hz)

Power consumption.....6 watts

Dimensions.....430 mm (16-15/16") W

80 mm (3-3/16") H

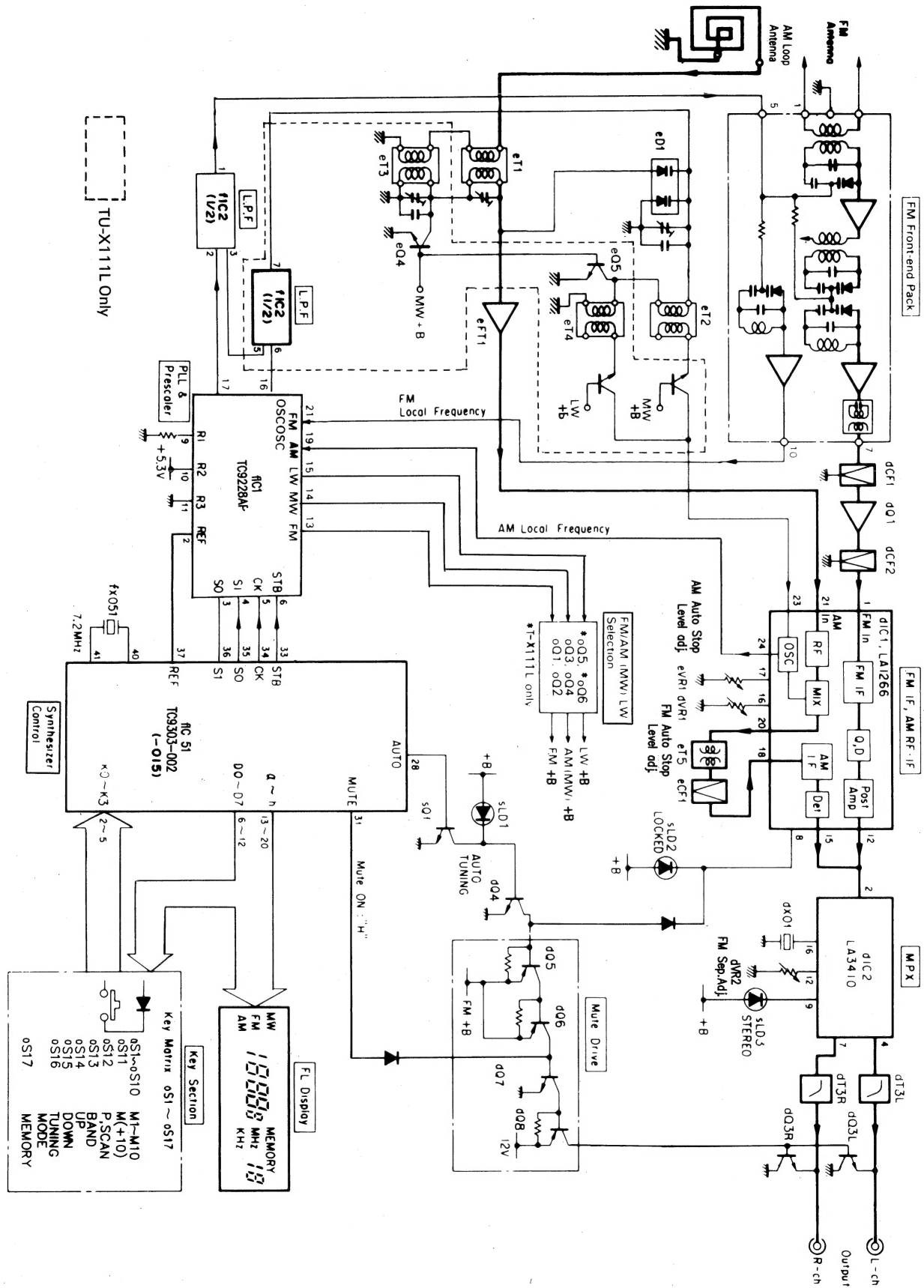
270 mm (10-11/16") D

Weight.....2.6 kg (5.7 lbs) net

* Design and specifications subject to change without notice for improvements.

* Due to local laws and regulations, this unit sold in some areas are not equipped with variable voltage selectors.

1. BLOCK DIAGRAM



2. ADJUSTMENT METHOD

2-1. Reference Frequency Adjustment (See Fig. 2-2 & 2-3 on Page 3)

(This adjustment is applied to EG and IPT models.)

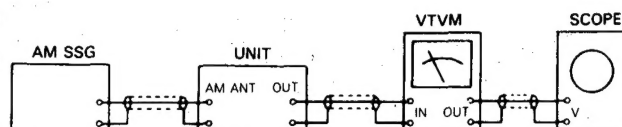
Note: 1. Power Switch ON
2. BAND Switch FM

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
		FROM	TO				
		No Input		Between Point ③ (Pin 21 of f1C1) and GND (F-6264) Frequency Counter with high Impedance probe	fTC51 (F-6265)	118.7MHz \pm 1kHz	FL Display 108.0MHz (Reception Frequency)

2-2. AM (MW, LW) Adjustment (See Fig. 2-2 Adjustment points of F-6264 on Page 3)

Note: 1. BAND Switch AM (TU-X111),
BAND Switch MW (TU-X111L)
2. Connect as shown Fig. 2-1.

Fig. 2-1



1) AM IF and MW (AM) Tuning Adjustment

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
		FROM	TO				
1.	531kHz ① (or 520kHz) ※1 (or 530kHz) ※2 Tuning Voltage Adj.	No Input	—	FL Display (Reception Frequency)	MANUAL TUNING, TUNING (Λ, V) Switch	531kHz ① (or 520kHz) ※1 (or 530kHz) ※2 ②	•Repeat precedures as stated in STEP 1 and 2.
				Between Point ⑥ (JW175, F-6264) and GND, DC Volt Meter	eT2 (F-6264)	DC 1.0V \pm 0.1V	
2.	1602kHz ① (or 1710kHz) ※1 (or 1610kHz) ※2 Tuning Voltage Adj.	No Input	—	FL Display (Reception Frequency)	MANUAL TUNING, TUNING (Λ, V) Switch	1602kHz ① (or 1710kHz) ※1 (or 1610kHz) ※2 ②	
				Between Point ⑥ (JW175, F-6264) and GND, DC Volt Meter	eTC2 (F-6264)	8.0V \pm 0.1V (1602kHz) ① 9.0V \pm 0.1V (1710kHz) ②	
3.	603kHz ① (or 600kHz) ② RF Adj.	603kHz ① (or 600kHz) ② ANT Input, 50dB, 400Hz (30% MOD.), AM SSG	AM ANT Terminal	FL Display (Reception Frequency)	MANUAL TUNING, TUNING (Λ, V) Switch	603kHz ① (or 600kHz) ②	•Repeat precedures as stated in STEP 3 and 4.
				Output L or R ch, VTVM & Oscilloscope	eT1 (F-6264)	Max. Output	
4.	1404kHz ① (or 1400kHz) ② RF Adj.	1404kHz ① (or 1400kHz) ② ANT Input, 30dB, 400Hz (30% MOD.), AM SSG	AM ANT Terminal	FL Display (Reception Frequency)	MANUAL TUNING, TUNING (Λ, V) Switch	1404kHz ① (or 1400kHz) ②	
				Output L or R ch, VTVM & Oscilloscope	eTC1 (F-6264)	Max. Output	
5.	IF Coil Adj.	999kHz ① (or 1000kHz) ② ANT Input, 50dB, 400Hz (30% MOD.), AM SSG	AM ANT Terminal	Output L or R ch, VTVM & Oscilloscope	eT5 (eCF1) (F-6264)	Max. Output	
6.	Auto stop Level Adj.	999kHz ① (or 1000kHz) ② ANT Input, 50dB, 400Hz (30% MOD.), AM SSG	AM ANT Terminal	Between Point ③ (Pin 8 of d1C1) and GND. (F-6264) DC Volt Meter	eVR1 (F-6264)	•Voltage from High level to Low level •LOCKED Indicator turns ON.	

Note: •When IC (f1C51) is TC9303-015, adjust by ※1. If the IC (f1C51) is TC9303-002, adjust by ※2.

•AM 9kHz/10kHz Selection Switch (o518)

9kHz: ① Mark Frequency

10kHz: ② Mark Frequency

2) LW Tuning Adjustment < TU-X111L only >

Note: BAND Switch LW

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
		FROM	TO				
1.	153kHz Tuning Adj.	No Input	—	FL Display (Reception Frequency)	MANUAL TUNING, TUNING (Λ, V) Switch	153kHz	•Repeat precedures as stated in STEP 1 and 2.
				Between Point (F) (JW175, F-6264) and GND, DC Volt Meter	eT4 (F-6264)	1.0V ± 0.1V	
2.	281kHz Tuning Adj.	No Input	—	FL Display (Reception Frequency)	MANUAL TUNING, TUNING (Λ, V) Switch	281kHz	
				Between Point (F) (JW175, F-6264) and GND, DC Volt Meter	eTC4 (F-6264)	5.4V ± 0.1V	
3.	170kHz RF Adj.	170kHz ANT Input, 60dB, 400Hz (30% MOD.), AM SSG	ANTENNA Terminal	FL Display (Reception Frequency)	MANUAL TUNING, TUNING (Λ, V) Switch	170kHz	•Repeat precedures as stated in STEP 3 and 4.
				Output L or R ch, VTVM & Oscilloscope	eT3 (F-6264)	MAX. Output	
4.	260kHz RF Adj.	260kHz ANT Input, 60dB, 400Hz (30% MOD.), AM SSG	Same as above	FL Display (Reception Frequency)	MANUAL TUNING, TUNING (Λ, V) Switch	260kHz	
				Output L or R ch, VTVM & Oscilloscope	eTC3 (F-6264)	MAX. Output	

Fig. 2-2 Adjustment points of F-6264

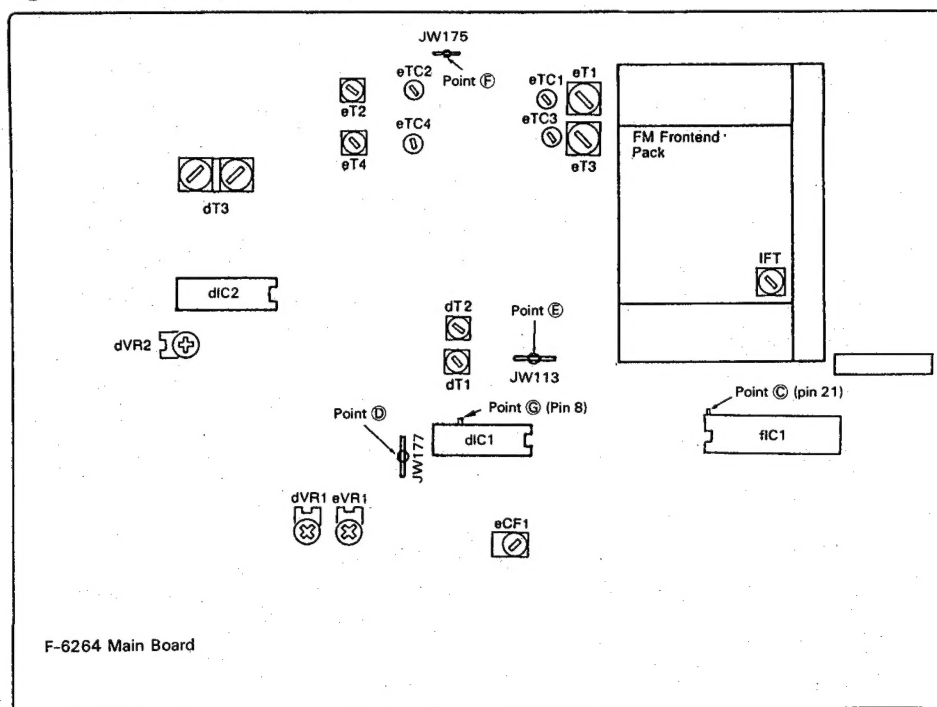
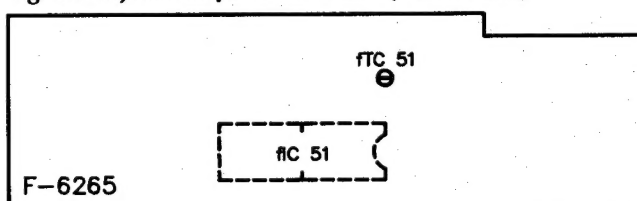
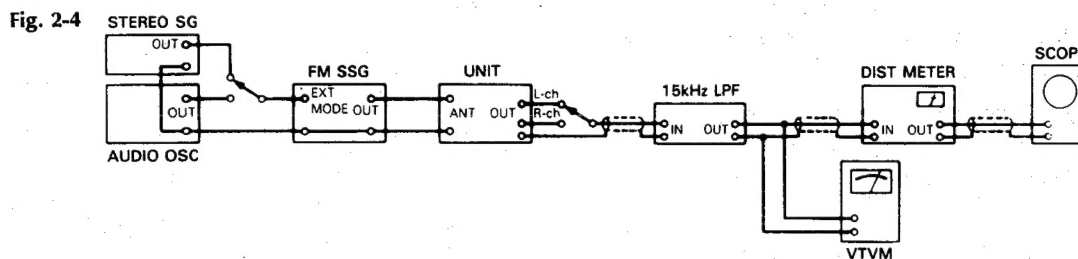


Fig. 2-3 Adjustment points of F-6265 (Pattern side)



2-3. FM Adjustment (See Fig. 2-2 Adjustment points of F-6264 on page 3)

Note: 1. BAND Switch..... FM
2. Connect as shown Fig. 2-4.



STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
		FROM	TO				
1.	Discriminator Coil Adj.	① 98MHz ANT Input, 65dBf (59.8dB), No MOD.,	FM ANT Terminal	Between Point ① (Jumper Wire JW177) and Point ⑤ (Jumper Wire JW113)(F-6264) DC Volt Meter	dT1 (F-6264)	DC 0V ± 30mV	•Repeat procedures as stated in subject ① & ②.
		② 98MHz ANT Input, 65dBf (59.8dB), 1kHz (100% MOD.), FM SSG	Same as above	FL Display (Reception Frequency)	MANUAL TUNING, TUNING (Λ, V) Switch	98.00MHz	
				Output L or R ch, Dist Meter	dT2 (F-6264)	Min. THD	
2.	Auto Stop Level Adj.	98MHz ANT Input, 22dBf (16.8dB), 1kHz (100% MOD.), FM SSG	FM ANT Terminal	FL Display (Reception Frequency)	MANUAL TUNING, TUNING (Λ, V) Switch	98.00MHz	
				Between Point ③ (Pin 8 of dIC 1) and GND. (F-6264) DC Volt Meter	dVR1 (F-6264)	•Voltage from High level to Low level •LOCKED Indicator turns ON.	
3.	Distortion Adj. (IF Coil)	98MHz ANT Input, 65dBf (59.8dB), FM SSG, Pilot 19kHz (9% MOD.), L-R MODE 1kHz + Pilot (100% MOD.), STEREO SG	FM ANT Terminal	FL Display (Reception Frequency)	MANUAL TUNING, TUNING (Λ, V) Switch	98.00MHz	
				Output L or R ch, Distortion Meter	IFT Coil (Front-end Pack)	Min. THD	
4.	Stereo Separation Adj.	98MHz ANT Input, 65dBf (59.8dB), FM SSG, Pilot 19kHz (9% MOD.), L MODE 1kHz + Pilot (100% MOD.), STEREO SG	FM ANT Terminal	OUTPUT L ch, VTVM & Oscilloscope	—	Read the indication on VTVM	•Confirm R→L •Confirm the stereo indicator lit.
				OUTPUT R ch, VTVM & Oscilloscope	dVR2 (F-6264)	Min. Separation	

◆ NOTICE FOR FM ADJUSTMENT

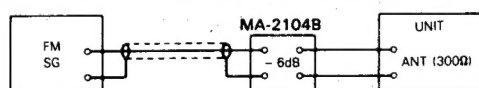
There are two kind in indication of FM SSG output attenuator.

1. Attenuator with marking of 75Ω open open indication type.
2. Attenuator with marking of 75Ω load or close load or close indication type.

FM SG output level in this FM adjustment are described as open indication type.

To feed FM signal, a dummy antenna circuit as Fig. 2-5 must be connected between FM SG output and ANT terminal (300Ω) of the unit.

Fig. 2-5



- The following table shows relations among FM SG attenuator indication (dB), available power ratio (dBf) and antenna terminal voltage (dB/μV) in each indication type.

	FM SG Attenuator Indication	Available Power Ratio	Antenna Terminal Voltage
Open indication type	0 dB 66 dB	-0.8 dBf 65.2 dBf	-6 dB/μV 60 dB/μV
Load or close indication type	0 dB 60 dB	5.2 dBf 65.2 dBf	0 dB/μV 60 dB/μV

3. PARTS LIST OF BOARD

1. Some printed circuit boards are not supplied assembled.
To separate these in this Parts list, the stock numbers are not indicated for these boards. However, stock numbers for individual parts are indicated.
2. Since some capacitors and resistors are omitted from parts lists in this Parts List, refer to the Common Parts List for capacitors and resistors, which was issued on June 1987.
3. Abbreviations in this Parts List are as follows.

•Abbreviations List

C.R.	: Carbon Resistor	E.B.	: Bi-Polar Electrolytic Capacitor
S.R.	: Solid Resistor	E.B.L.	: Low Leak Bi-Polar Electrolytic Capacitor
Ce.R.	: Cement Resistor	F.C.	: Film Capacitor
M.R.	: Metal Film Resistor	M.P.	: Metalized Paper Capacitor
F.R.	: Fusing Resistor	P.C.	: Polystyrene Capacitor
N.I.R.	: Non-Inflammable Resistor	M.M.C.	: Metalized Mylar Capacitor
A.R.	: Array Resistor	A.C.	: Array Capacitor
C.C.	: Ceramic Capacitor	V.R.	: Variable Resistor
C.T.	: Ceramic Capacitor, Temperature Compensation	S.V.R.	: Semi Variable Resistor
E.C.	: Electrolytic Capacitor	SW.	: Switch
E.L.	: Low Leak Electrolytic Capacitor	Chip R.	: Chip Resistor
Ta.C.	: Tantalum Capacitor	Chip C.	: Chip Capacitor

3-1. F-6264 Main Board

(Stock No. 01203101 = TU-X111 XX, SS

01203105 = TU-X111 EU/01203108 = TU-X111 EG

01203705 = TU-X111 IPT/01203405 = TU-X111L EU

01203406 = TU-X111L UK/01203409 = TU-X111L SEV)

Parts No.	Stock No.	Description
dZ1	48569000	FM Frontend Pack (TU-X111 XX,SS)
	48729600	FM Frontend Pack (TU-X111 IPT,EG)
	49474500	FM Frontend Pack (TU-X111 EU/TU-X111L)
•Transistor		
dQ1	46393201	2SC2786
dQ2	46367101	2SC2603
	or 48058801	2SC1740S
dQ3	46604301	2SC3327
dQ4	46367101	2SC2603
	or 48058801	2SC1740S
dQ5	46367001	2SA1115
	or 48058601	2SA933S
dQ6	46367001	2SA1115
	or 48058601	2SA933S
dQ7	46367101	2SC2603
	or 48058801	2SC1740S
dQ8	46367001	2SA1115
	or 48058601	2SA933S
•IC		
dIC1	48715100	LA1266
dIC2	48491000	LA3410A
dX01	48272800	CERAMIC OSC ELEMENT CSB456
•Diode		
dD1~11	46464100	1SS133
dC6	48417200	0.047 μ F 16V C.C.
dC7	48417200	0.047 μ F 16V C.C.
dC11	48417200	0.047 μ F 16V C.C.
dC15	48101600	22 μ F 10V C.C.
dC17	48417200	0.047 μ F 16V C.C.
dC51	48101600	22 μ F 10V E.B. (TU-X111 EG, IPT)
dCF1	48064800	Ceramic Filter SFE10.7MS3G (TU-X111 EU,EG, IPT/TU-X111L)
	46202500	Ceramic Filter SFE10.7MS2H (TU-X111 XX,SS)
dCF2	48064800	Ceramic Filter SFE10.7MS3G (TU-X111 EU,EG, IPT/TU-X111L)
	46202500	Ceramic Filter SFE10.7MS2H (TU-X111 XX,SS)
dT1	48718700	FM 1F Coil
dT2	48718600	FM 1F Coil
dT3	46894900	Low Pass Filter

Parts No.	Stock No.	Description
dT51	48791700	Filter(TU-X111 EG, IPT)
dVR1	46634700	47k Ω S.V.R. Auto Stop Adj.
dVR2	46634900	100k Ω S.V.R. Separation Adj.
Δ dR7	46228200	22 Ω 1/2W N.I.R.
Δ dR17	46228200	22 Ω 1/2W N.I.R.
•Transistor		
eQ1~3	46367101	2SC2603
	or 48058801	2SC1740S
eQ4	46604301	2SC3327(TU-X111L)
eQ5	46604301	2SC3327(TU-X111L)
eQ6	46367101	2SC2603(TU-X111L)
	or 48058801	2SC1740S(TU-X111L)
eQ7	46367101	2SC2603(TU-X111L)
	or 48058801	2SC1740S(TU-X111L)
•FET		
eFT1	46393000	2SK192A
	or 46393001	2SK192A
•Diode		
eD1	46146300	Voltage V.C. Diode KV1236Z2
	or 46708400	Voltage V.C. Diode SVC321
eD2	46464100	1SS133
eD3	46464100	1SS133
eC13	48103000	0.22 μ F 50V E.B.
eC17	48417200	0.047 μ F 16V C.C. (TU-X111L EU,UK,SEV)
eC18	48417200	0.047 μ F 16V C.C. (TU-X111L EU,UK,SEV)
eTC1	49489100	30pF Trimmer Capacitor
eTC2	49489100	30pF Trimmer Capacitor
eTC3	49489100	30pF Trimmer Capacitor (TU-X111L)
eTC4	49489100	30pF Trimmer Capacitor (TU-X111L)
eCF1	48069900	Ceramic Filter CFM-450BL (TU-X111L)
	48069810	Ceramic Filter CFBZ-450A (TU-X111)
eL1	46091910	Inductor 39MH
eT1	46394600	AM ANT Coil
eT2	48568800	AM OSC Coil
eT3	48577500	LW ANT Coil(TU-X111L)
eT4	48074410	LW OSC Coil(TU-X111L)
eT5	49323800	AM 1F Coil(TU-X111L)
eVR1	46634400	15k Ω S.V.R. Auto Stop Adj.

<F-6264>

Parts No.	Stock No.	Description
•IC		
fIC1	49322400	TC9228P
fIC2	49439500	NJM4558L
•Diode		
fD1~3	46464100	1SS133
fD60~63	46464100	1SS133
fC7	48717800	4.7 μ F 5.5V E.C.
fC11	48103500	2.2 μ F 50V E.B.
fC13	48103400	1 μ F 50V E.B.(TU-X111L)
△ fR11	46228200	22 Ω 1/2W N.I.R.
fL1~3	48290200	INDUCTOR 47 μ H
•Transistor		
mQ1	46367001	2SA1115
or	48058601	2SA933S
mQ2	46367001	2SA1115
or	48058601	2SA933S
•IC		
△ mIC1	46361500	L78N12
△ mIC2	46361200	L78N06
•Diode		
△ mD1	46273600	DBB10B
or	46273700	DBB10C
△ mD2	46273600	DBB10B
or	46273700	DBB10C
△ mD3	46464100	1SS133
•Zener Diode		
mDZ1	48557200	MTZ24B
or	48557300	MTZ24C
mDZ2	48553400	MTZ7.5C
or	48553500	MTZ8.2A
mDZ3	48551900	MTZ4.7C
or	48552000	MTZ5.1A
△ mR1	46624900	330 Ω 2W N.I.R.
△ mR2	46230600	2.2k Ω 1/2W N.I.R.
△ mR3	46230600	2.2k Ω 1/2W N.I.R.
△ mPT1	15036601	Power Transformer (TU-X111 XX,SS)
△	15036605	Power Transformer(TU-X111 EU,EG,IPT/TU-X111L EU,SEV)
△	15036506	Power Transformer (TU-X111L UK)
•Transistor		
oQ1	46367101	2SC2603
or	48058801	2SC1740S
oQ2	46367001	2SA1115
or	48058601	2SA933S
oQ3	46367101	2SC2603
or	48058801	2SC1740S
oQ4	46367001	2SA1115
or	48058601	2SA933S
oQ5	46367101	2SC2603(TU-X111L)
or	48058801	2SC1740S(TU-X111L)
oQ6	46367001	2SA1115(TU-X111L)
or	48058601	2SA933S(TU-X111L)
oS18	46533500	Slide SW.,10k/9kHz (TU-X111 XX,SS)
•Diode		
oD1	46464100	1SS133(TU-X111L)
oD2	46464100	1SS133(TU-X111L)
oZ1	46547300	4P Terminal,Antenna (TU-X111 XX,SS,EU/TU-X111L)
	49320400	4P Terminal,Antenna (TU-X111 EG,IPT)
oZ2	48528400	2P Terminal,OUTPUT
oZ3	46732000	Ground Terminal

3-2. F-6265 PLL Synthesizer Control Board

(Stock No. 01203201 = TU-X111 XX, SS

01203205 = TU-X111 EU/01203208 = TU-X111 EG

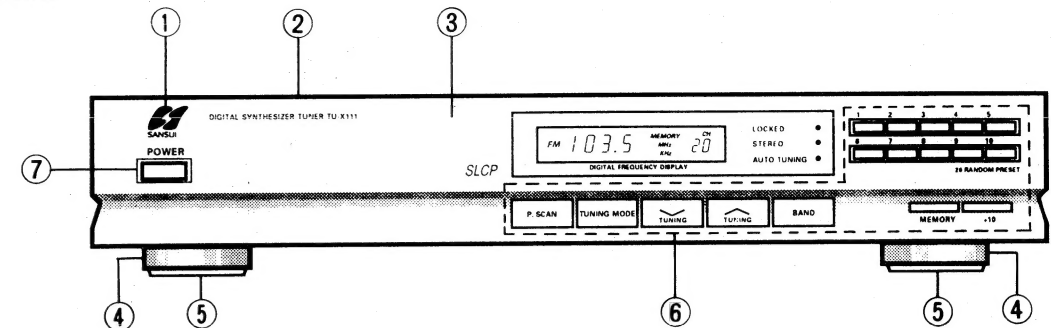
01203805 = TU-X111 IPT

01203505 = TU-X111L)

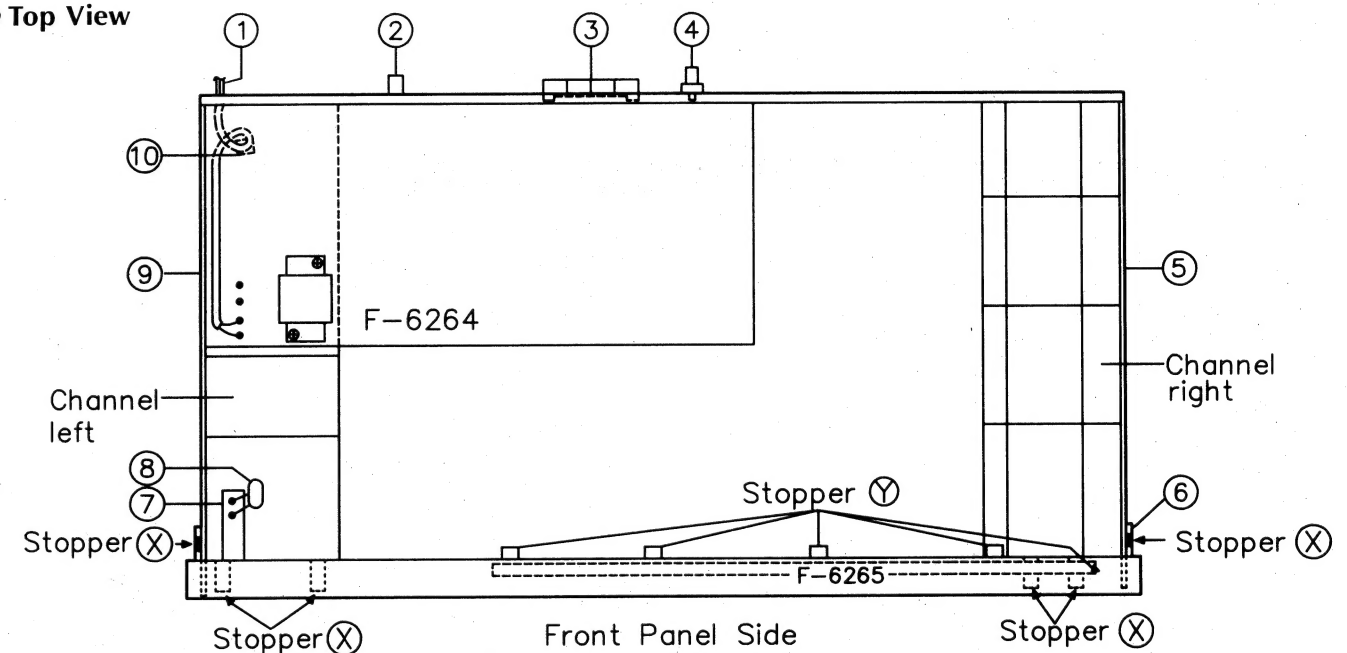
Parts No.	Stock No.	Description
•Transistor		
fQ51	48230200	DTC124XS
fQ52	48230200	DTC124XS
•IC		
fIC51	48367800	TC9303AN-002
or	49492600	TC9303AN-015
fXO51	48905800	Quartz Element
•Diode		
fD51~58	46464100	1SS133
fD59	46464100	1SS133(TU-X111 XX,SS,EU,EG/TU-X111L)
fC55	48665400	2200pF 50V C.C.
fTC51	49489700	30pF Trimmer Capacitor (TU-X111 EG,IPT)
oS1~10	49326300	Push SW.,Memory 1~10
oS11	49326300	Push SW.,Memory(+10)
oS12	49326300	Push SW.,P.Scan
oS13	49326300	Push SW.,BAND
oS14	49326300	Push SW.,UP
oS15	49326300	Push SW.,DOWN
oS16	49326300	Push SW.,TUNING
oS17	49326300	Push SW.,Memory
•Transistor		
sQ1	46367101	2SC2603
or	48058801	2SC1740S
•LED		
sFL1	48182600	FL.Display Tube FG78M1GR
sLD1	49492500	SEL3910A(TU-X111 EU,EG,IPT/TU-X111L)
sLD2	49325900	SEL3210S(TU-X111 XX,SS)
49492500		SEL3910A(TU-X111 EU,EG,IPT/TU-X111L)
sLD3	49325900	SEL3210S(TU-X111 XX,SS)
49325900		SEL3210S

4. OTHER PARTS

● Front View



● Top View



Parts List <Front View>

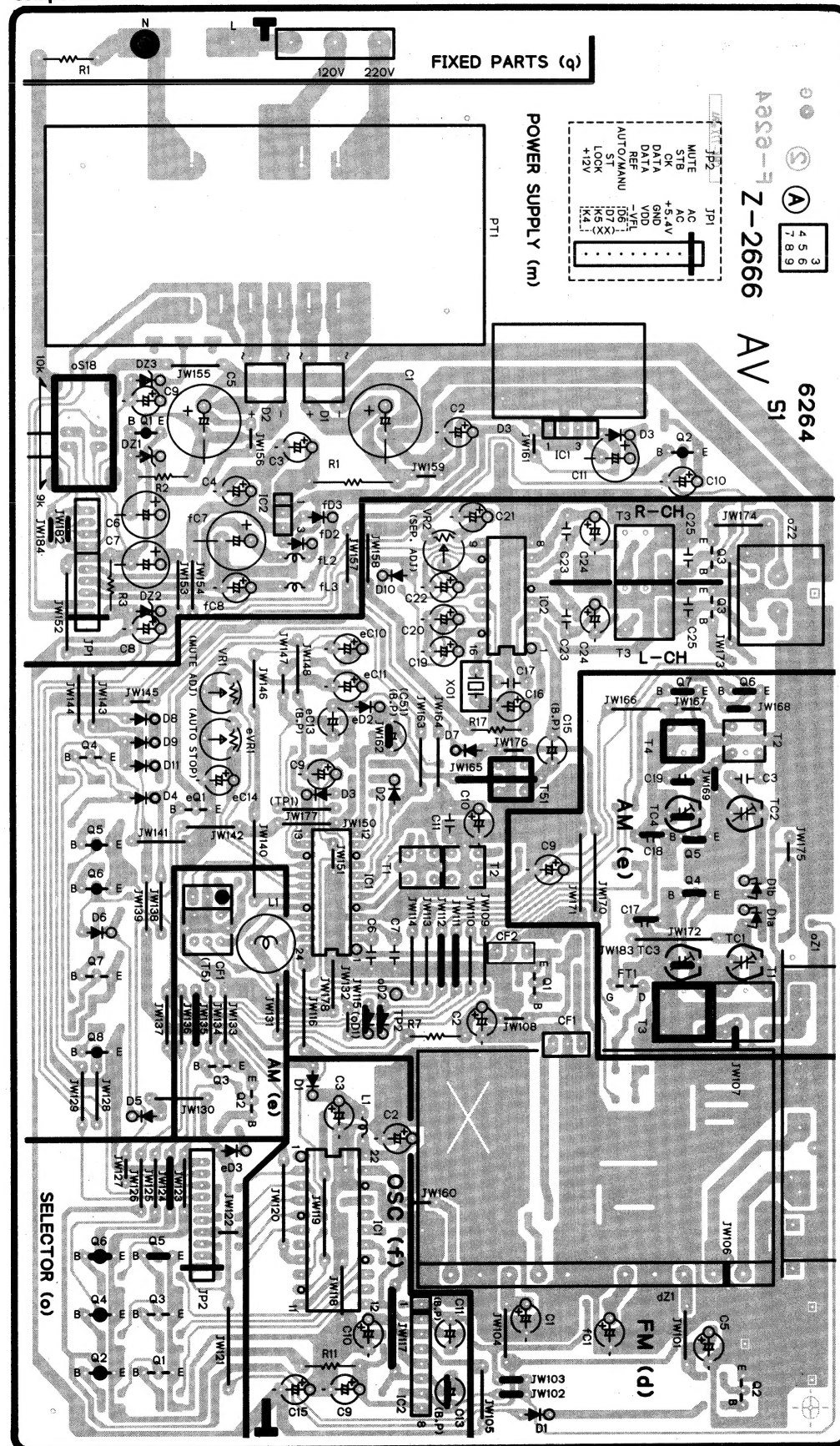
Parts No.	Stock No.	Description
1	27833300	Logo Badge
2	27827900	Bonnet
3	27828500	Front Panel-A,Outside (TU-X111)
	27828600	Front Panel-A,Outside (TU-X111L)
4	27857010	Ring for Leg
5	27842000	Leg Sheet
6	49326300	Push SW.,Preset,+10, Memory,Band,Tuning VA, Tuning Mode,P.Scan
7	27626500	Knob,Power

Parts List <Top View>

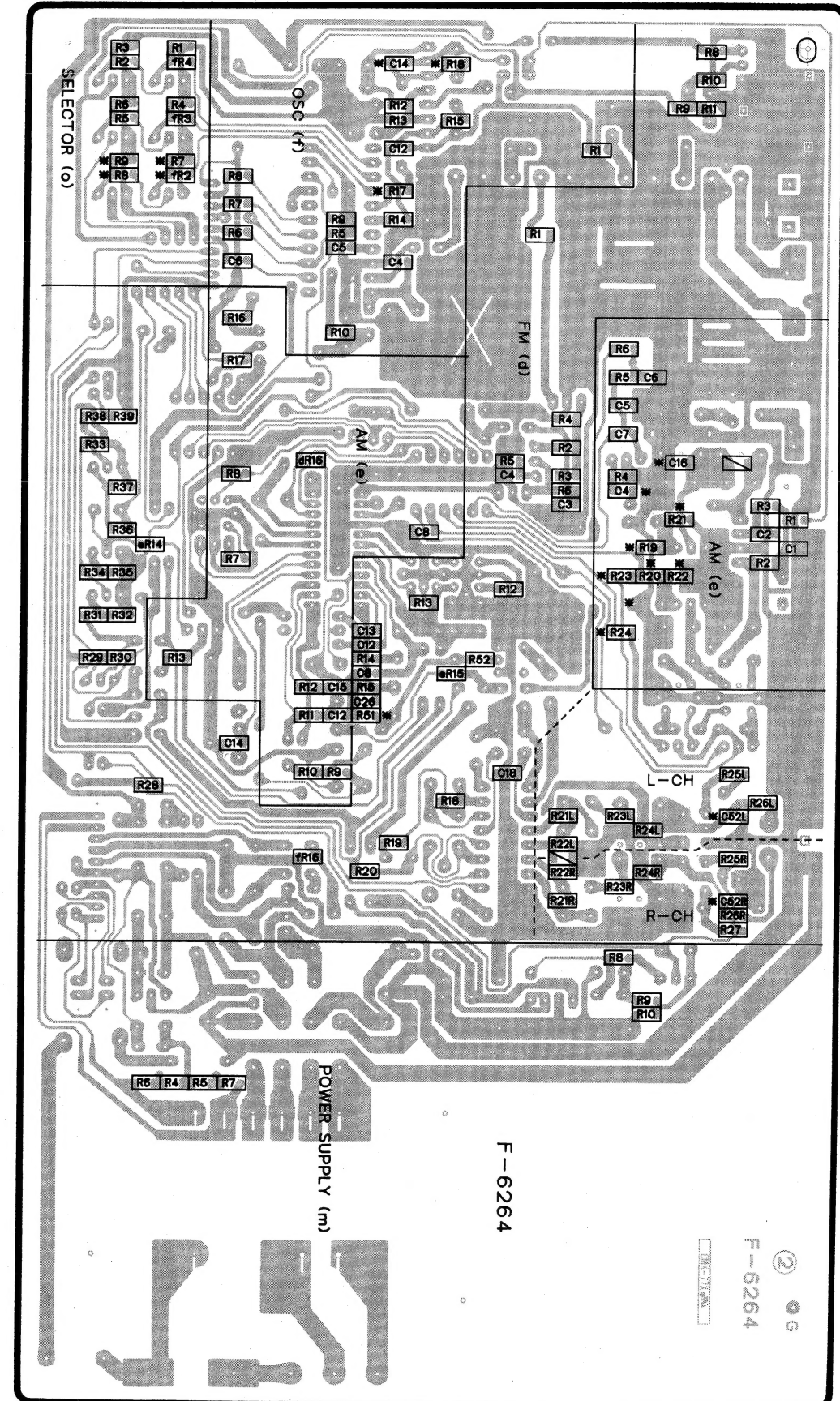
Parts No.	Stock No.	Description
△ 1	38004700	Power Supply Cord (TU-X111 XX)
△	48837700	Power Supply Cord (TU-X111 SS)
△	49299300	Power Supply Cord (TU-X111 EU,EG,IPT/TU-X111L EU,SEV)
△	49252900	Power Supply Cord (TU-X111L UK)
2	48528400	2P Terminal,OUTPUT
3	46547300	4P Terminal,Antenna (TU-X111 XX,SS,EU/TU-X111L EU,UK,SEV)
	49320400	2P Terminal,Antenna (TU-X111 EG,IPT)
4	46732000	Ground Terminal
5	27820810	Channel,Right
6	27830200	Front Panel-B,Inside (TU-X111 XX,SS)
	27830300	Front Panel-B,Inside (TU-X111 EU,EG,IPT/TU-X111L EU,UK,SEV)(refer to Fig.7-1 on page 7)
△ 7	46364300	Push SW.,POWER
△ 8	46943200	0.01 μ F 400V C.C.
9	27820710	Channel,Left
10	46270501	Ferrite Bead(TU-X111 EG,IPT)

Caution: The power transformer is in the F-6264 P.C.Board ass'y.

9-2. F-6264 Main Board Component Side

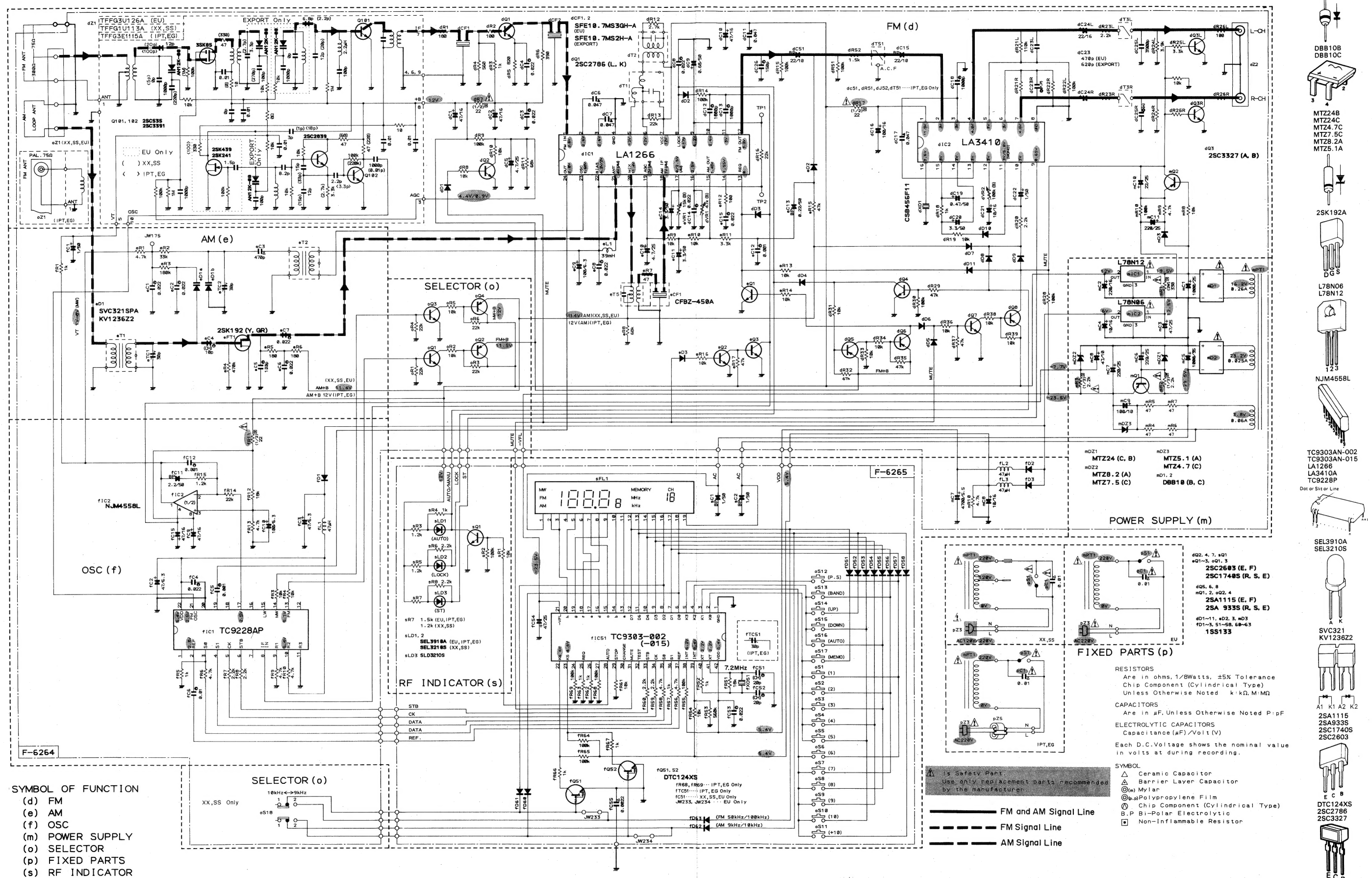


Pattern Side (Chip Parts)



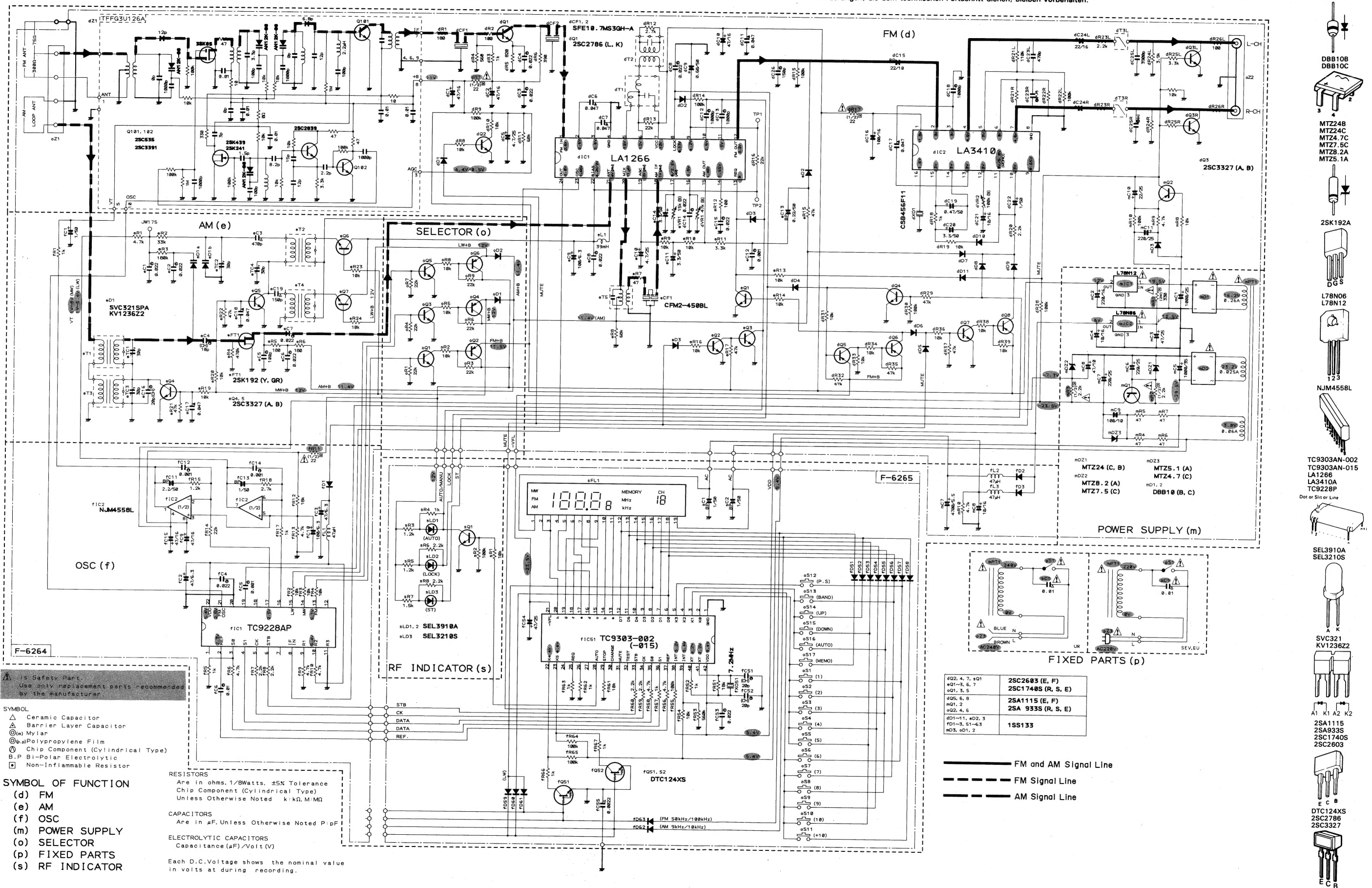
10. SCHEMATIC DIAGRAM 10-1. TU-X111

• Design and specifications subject to change without notice for improvement.
• La présentation et les spécifications sont susceptibles d'être modifiées sans préavis par suites d'améliorations éventuelles.
• Änderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.



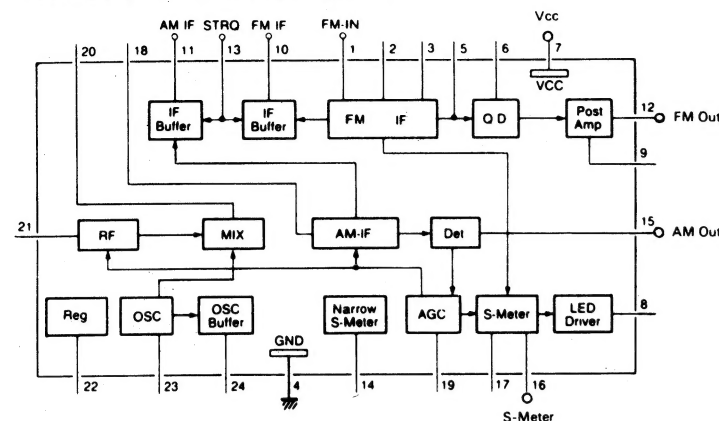
10-2. TU-X111L

Design and specifications subject to change without notice for improvement.
 La présentation et les spécifications sont susceptibles d'être modifiées sans préavis par suites d'améliorations éventuelles.
 Änderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.

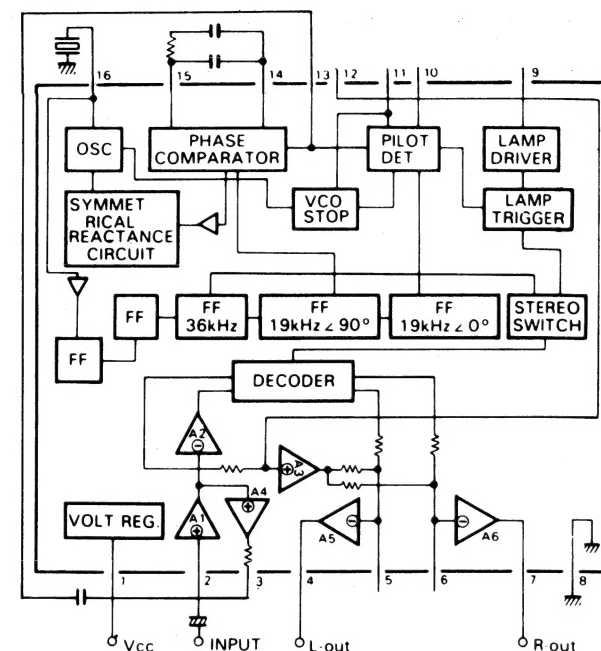


11. INTERIOR BLOCK DIAGRAM & TERMINAL FUNCTION OF IC

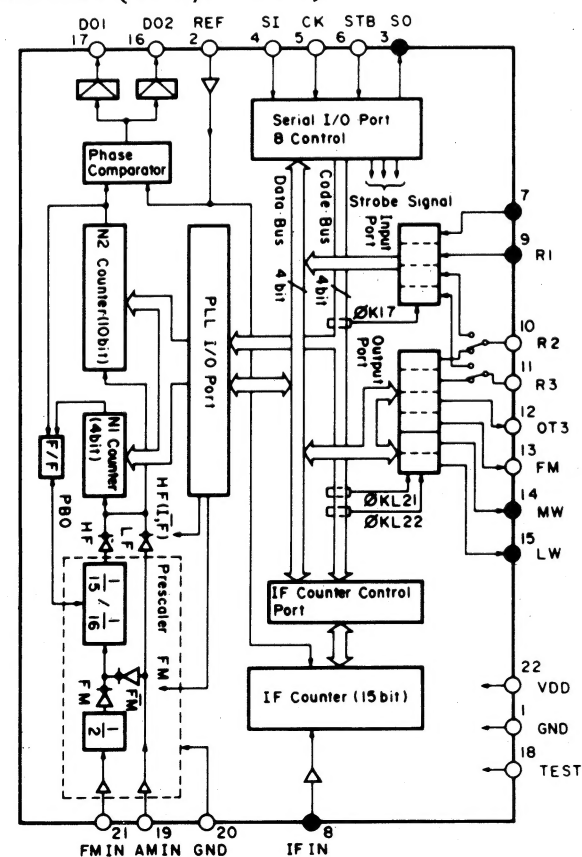
•LA1266 (FM IF, AM RF-MIX-IF)



•LA3410 (MPX)



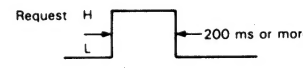
•TC9228P (PLL Synthesizer)



◆ Terminal Function <TC9228P>

Pin No.	Symbols on substrate	Functions
2	REF	Reference frequency signal input terminal
3	SO	Serial data output terminal
4	SI	Serial data input terminal
5	CK	Clock signal input terminal
6	STB	Strobe signal input terminal
8	IFIN	Terminal to input IF signal for performing the automatic search stop.
9	R1	Terminals to input signals from the remote controller. 7-kind key input instructions are available in combination with TC-9303N-002 (-015).
10	R2	
11	R3	
13	FM	Band selector signal output terminal
14	MW	
15	LW	
16	DO ₂	Terminals to output a signal from a phase comparator.
17	DO ₁	
18	TEST	Terminal to input a signal of test mode.
19	AMIN	Terminal to input a signal from the AM local OSC.
20	GND	Ground terminal for prescaler
21	FMIN	Terminal to input a signal from the FM local OSC.
22	VDD	Power supply terminals. 5V ± 0.5V
1	GND	Ground terminal

◆ Terminal Function of TC9303N <Tuning Controller>

Pin No.	Pin Name	Input/Output	Description
2 ~ 7 22, 23	K0 ~ K3 K4, K5	Input	Ports for inputting a key matrix signal. On the other hand, key return timing signals are outputted from output parts DO ~ D7.
6 ~ 12	DO ~ D7	Output	Ports for outputting digit signals to FL display and a key return signal source.
13 ~ 20	a ~ h	Output	Ports for outputting segment signals to FL display.
21	-VFL	-	Terminal for a device supply - voltage.
25	REQ.	Input	Terminal for inputting a request signal for remote controller. When a "H" level signal is applied, remote control data is accepted.
28	AUTO	Output	Terminal for outputting LED driver signal for indicating AUTO during auto search tuning operation. "H" level when active.
29	STOP	Input	Terminal to input a signal for performing the automatic search stop. When a "H" level signal is applied during automatic search operation, the scanning operation stop.
30	CHANGE	Output	Terminal for outputting a changing signal. (For Computer selector signal) In changing, the terminal becomes a "H" level signal. Changing signal is outputted in the following cases: 1. When INH changes from "L" to "H".
30	CHANGE	Output	2. When each input key is depressed normally. 3. When a band key corresponding to the presently received band is depressed. 4. When remote control REQUEST changes to "H" (inclusive NOP.)  Note: CHANGE is not outputted when INH changes from "H" to "L".
31	MUTE	Output	Terminal to output the muting signal. The kept in "L" level in ordinary state, and in "H" level in muting. The muting signal is outputted in the following: • When "INH" terminal changes from "L" to "H". • When band is switched. • When memory is accessed (in the same band). • In FM manual tuning. • In MW and LW manual tuning. • In AUTO-tuning stop. • When "INH" terminal changes from "H" to "L".

Pin No.	Pin Name	Input/Output	Description
32	TEST	Input	Terminal for inputting a test mode control signal. The device is returned to the ordinary operation at "L" level or NC status. This terminal is fixed at "L" level usually.
33	STB	Output	Serial interfaces for STB (strobe pulse output), CD (serial clock output), SO (serial data output) and SI (serial data input). TC9228P PLL IC is controlled by executing SIO instruction.
34	CK	Output	
35	SO	Output	
36	SI	Input	
37	REF	Output	Terminal for outputting a reference frequency signal supplied to TC9228P PLL IC. Note: This output is fixed at "L" level automatically when INH input is at "L" level.
38	INT	Input	Terminal for inputting a system resetting signal to device. When INT is at "L" level, the device is reset; when at "H" level, program starts beginning from address No.0. This terminal is usually fixed at "H" level, because the device is reset when a voltage of 4.5V is applied to VDD. (power-on reset)
39	INH	Input	Port for inputting a radio mode selection signal. Radio-on mode is set at "H" level; radio-off mode is set at "L" level. When this terminal at "L" level, the REF output is fixed at "L" level automatically.
40	X _T	-	Terminals for connecting a quartz oscillator of 7.2 MHz.
41	X _T	-	
42	VDD	-	Terminal for applying a device supply voltage. In the normal operation, a voltage of 5V ± 10% is applied; but in back-up condition, the voltage can be reduced to 2V. Further, when a voltage of 4.5V is applied to this terminal, the device is reset and then program start beginning from address No.0 (power-on reset).



SANSUI ELECTRIC CO., LTD.:

SANSUI ELECTRONICS CORPORATION:

SANSUI ELECTRONICS G.M.B.H.:

山水電気株式会社

14-1, Izumi 2-chome, Suginami-ku Tokyo 168 Japan
 PHONE: (03) 324-8891/TELEX: 232-2076 (International Division)
 1250 Valley Brook Ave. Lyndhurst, N.J. 07071 U.S.A.
 17150 South Margay Ave. Carson, California 90746 U.S.A.
 Paul Ehrlich Strasse 8, 6074 Rödermark 2, West Germany

東京都杉並区和泉2-14-1 (〒168)

(SM2-153)

Printed in Japan (1989.11.P)

<Stock No. 36551200>